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PLANETARY PHENOMENA FOR JANUARY AND FEBRUARY, 1906.

By Malcolm McNeill.

PHASES OF THE MOON, PACIFIC TIME.

First Quarter,	Jan.	2,	6^{h} 52^{m} A.M.	First Quarter,	Feb.	1,	4^{h} 31^{m} A.M.
Full Moon,	"	10,	8 37 A.M.	Full Moon,	"	8,	11 46 P.M.
Last Quarter,	"	17,	12 49 P.M.	Last Quarter,	"	15,	8 22 P.M.
New Moon,	"	24,	9 9 A.M.	New Moon,	"	22,	11 57 P.M.

The Earth is in perihedion on the morning of January 3d.

The first of the five eclipses of the year will occur on the night of February 8-9th, and will be a total eclipse of the Moon. It will be visible throughout the United States. The times of the principal circumstances are as follows (Pacific time):—

Moon enters penumbra,	February 8,	8^{h}	54^{m}	P. M.
Moon enters shadow,	February 8,	9	57	P. M.
Total eclipse begins,	February 8,	10	58	P. M.
Middle of the eclipse,	February 8,	11	47	P. M.
Total eclipse ends,	February 9,	12	36	A. M.
Moon leaves shadow,	February 9,	1	37	A. M.
Moon leaves penumbra,	February 9,	2	40	A. M.

The second eclipse will be a partial eclipse of the Sun on the night of February 22-23d, Pacific time, and will therefore not be seen in the United States. The region of visibility is the part of the Earth near the south pole, and in one place it extends far enough north to include a part of southern Australia.

Mercury is a morning star on January 1st, rising about an hour and three quarters before sunrise, and the interval is more than an hour until well after the middle of the month. It is therefore in good position for observation in the morning twilight. It reaches greatest west elongation on the afternoon of January 4th, and then begins slowly to approach the Sun, reaching superior conjunction on February 20th. It now becomes an evening star, and moves somewhat rapidly away from the Sun, but it is still too close for naked-eye observations at the end of the month.

Venus is also a morning star, rising less than an hour before sunrise on January 1st. Although it is much nearer the Sun than *Mercury,* it may be possible to see it in the morning twilight, on account of its great brightness, for a few days in early January; but its distance from the Sun is diminishing, and it reaches superior conjunction on the morning of February 14th. It is after this an evening star until November 29th, but will not move far enough away from the Sun to be seen in the evening twilight until after the middle of March. Several interesting conjunctions of *Mercury* and *Venus* with each other and with other planets occur during January and February, but most of them come when the planets are too near the Sun for naked-eye observations. *Venus* and *Mercury* are in close conjunction with *Uranus* on January 5th (distance 0° 6′), and on January 16th (distance 0° 19′), respectively. On February 22d *Venus* is in conjunction with *Saturn* (distance 0° 7′), *Mercury* with *Saturn* (distance 0° 17′), and *Venus* with *Mercury* (distance 0° 22′). They are at this date all evening stars, but are entirely too near the Sun to be seen.

Mars during January and February remains an evening star, setting at about 9 P. M. local mean time. This time changes scarcely at all during the period, being 9:05 on January 1st, and 8:58 on February 28th. The apparent distance of the planet from the Sun diminishes about 20° during the period, owing to the more rapid eastward motion of the Sun, but the planet is moving near a part of the ecliptic considerably north of the Sun's position, almost 15° at the end of February, and this materially retards its time of setting. Its actual distance from the Earth is still increasing somewhat rapidly, and in the middle of February is just about twice the mean distance of the Earth from the Sun. It is also growing fainter, but there will be no difficulty in identifying it.

Jupiter on January 1st is above the horizon until after 4 A. M., and on February 28th it sets at about midnight. It is in the constellation *Taurus* about 5° south of the *Pleiades* group, moves westward a little less than 1° until January 21st, and then moves eastward about 2° 30′ by the end of February.

Saturn is still an evening star on January 1st, setting at 8:40 P. M., local mean time, being about 4° west of *Mars* on this date, but its comparatively slow motion among the stars allows the Sun to rapidly approach it. On February 1st it sets only two hours after sunset, and it comes to conjunction with the Sun on February 24th. It is in the constellation *Aquarius,* a region rather barren of bright stars, and moves 6° eastward and 3° northward during the month. As seen in the telescope in early January the ratio of major to minor axis of the rings is about 6 to 1. This will change to about 19 to 1 by June, and then increase slightly until the end of the year. Next year the Earth will pass through the plane of the rings and they will be seen edgewise.

Uranus is a morning star, having passed conjunction with the Sun in December, and is too near the Sun to be seen until late in February. At the end of February it rises about three hours before sunrise. It moves about 3° eastward in the constellation *Sagittarius* and is a little north of the group known as "the milk dipper."

Neptune passed opposition with the Sun late in December, and is above the horizon nearly the entire night in early January. It is in the western part of the constellation *Gemini.*